EXHIBIT B

TO DECLARATION OF S. MERRILL WEISS IN SUPPORT OF PLAINTIFF ACACIA MEDIA TECHNOLOGIES CORPORATION'S MEMORANDUM OF POINTS AND AUTHORITIES IN OPPOSITION TO ROUND 3 DEFENDANTS' MOTION FOR SUMMARY JUDGMENT OF INVALIDITY UNDER 35 U.S.C. § 112 OF THE '992, '863, AND '702 PATENTS; AND SATELLITE DEFENDANTS' MOTION FOR SUMMARY JUDGMENT OF INVALIDITY OF THE '992, '863, AND '720 PATENTS

Hovsepian v. Apple, Inc. Doc. 325 Att. 1

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ID	Name	Functional Description	Descr. Ref	Input	From	Input Ref.	Output	To	Output Ref.	Mandatory/ Inherently Required/Optional	M/IR/O Ref	Part of	Alias	Alias Ref
100	Transmission System	User accesses by calling on phone or typing commands into a computer	3:55-58	Library items	Inherent input		Compressed formatted data blocks	Receiving system	2:62-3:3	Inherently required	3:50-4:63			
		User chooses audio a/o video material from list of available items	3:58-60	User requests	Telephone calls to system	3:54-58	Compressed formatted data blocks	A single receiving system	3:61-64 Figure 1a					
		May communicate with one or more reception systems	3:61-68, 4:9-11	User requests	Computer entry	3:54-58	Compressed formatted data blocks	Multiple receiving systems	3:64-68 Figure 1b					
		May have reception system & user directly connected	4:22-25 4:34-36 5:10-14	User requests	Remote order processing & item database	4:5-11	Compressed formatted data blocks	Reception system configured as a cable television system	4:14-18 Figure 1d					
		May have reception system & user indirectly connected	4:28-29 5:22-26				Compressed formatted data blocks	Reception system configured to feed multiple cable television systems	4:25-27 Figure 1e					
		May enable copy protection of specific items	5:34-39				Compressed formatted data blocks	Directly connected to user	4:22-25 Figure 1e					
		May be located in one facility or spread over a plurality of facilities	5:61-63				Compressed formatted data blocks	Indirectly connected to user	4:28-29 Figure 1e					
		May include only some of the elements shown in figure 2	5:63-65				Fully compressed & encoded, partly decompressed, or fully decompressed material	All reception system & user configurations	4:64-68					
		Includes source material library for temporary storage of items prior to conversion & storage in compressed data library	5:66-6:2				Compressed formatted data blocks	Reception system set up to relay requested material over airwave (VHF, UHF, or satellite) communication channels	4:52-63 Figure 1g					
		Portions can be split among separate locations	11:44-47											
		When system split among separate locations, user orders can be distributed between portions of system for ultimate distribution to requesting user	11:47-50											
111	Source Material Library	Provides temporary storage of items prior to conversion & storage in compressed data library	5:66-6:10	Media objects of many different types	Assumed to be accumulated by ordinary methods for type of media	5:66-6:2	Data from media formatted for compatibility to the digital a/o analog inputs of the system	Identification encoder via implicit electro-mechanical subsystems (e.g., telecine, tape player, or optical disk drive) for recovering data from media	6:15-19 7:35-43	Optional in any particular transmission system, but one is inherently required somewhere	5:63-65 5:66-6:2 7:44-58			
		May include a variety of different types of materials, e.g., television programs, movies, audio recordings, still pictures, files, books, computer tapes, computer disks, documents, musical instruments, & other physical objects	6:10-15	Analog & digital audio & video information	Assumed to be accumulated by ordinary methods for type of media	6:2-7	Example media formats from which data can be retrieved include digital or analog audio & video tapes, laser disks, film images, optical disks, magnetic disks, computer tapes, disks, & cartridges	Identification encoder via implicit electro-mechanical systems (e.g., telecine, tape player, of optical disk drive) for handling & playing media	6:19-22 7:35-43					
		Materials are converted to or recorded on media format compatible to digital or analog inputs of the system prior to compression & storage in compressed data library	6:15-19	Physical objects such as books & records that require conversion to a compatible media type	Assumed to be accumulated by ordinary methods for type of media	6:2-7	Data from media formatted for compatibility to the digital a/o analog inputs of the system	Converter via implicit electro-mechanical subsystems (e.g., telecine, tape player, or optical disk drive) for recovering data from media	6:58-62 7:35-43					
		Acceptable media formats include digital or analog audio or video tapes, laser disks, film images, optical disks, magnetic disks, computer tapes, disks, & cartridges	6:19-22	Materials such as television programs, movies, audio recordings, still pictures, files, books, computer tapes, computer disks, documents, etc	Assumed to be accumulated by ordinary methods for type of media	6:10-15	Example media formats from which data can be retrieved include digital or analog audio & video tapes, laser disks, film images, optical disks, magnetic disks, computer tapes, disks, & cartridges	Converter via implicit electro-mechanical systems (e.g., telecine, tape player, of optical disk drive) for handling & playing media	6:63-68 7:35-43					
		May comprise one or a plurality of libraries	6:23-26	Communications from other source material libraries	Other source material libraries	6:28-34	Communications to other source material libraries	Other source material libraries	6:28-34					
		A plurality may be near to or distant from one another	6:26-28	Previously compressed material on media (e.g., digital tape)	Compressed data libraries of other systems	7:44-48 &;55-58	Information, in the form of analog or digital, audio a/o video signals compatible with the inputs of the converter, retrieved from items stored in the library	Converter	6:55-58					
		A plurality may use any available method for inter-library communications	6:28-34				Information, in the form of analog or digital, audio a/o video signals compatible with the inputs of the converter, retrieved from items stored in the library	Identification encoder	6:58-62					
		Includes electro-mechanical systems necessary to play back & convert to analog or digital audio & video signals the content of stored media	7:35-39				Information, in the form of compressed digital signals, retrieved from media received from other systems	Compressed data formatting section	7:55-58					

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ID	Name	Functional Description	Descr. Ref	Input	From	Input Ref.	Output	To	Output Ref.	Mandatory/ Inherently Required/Optional	M/IR/O Ref	Part of	Alias	Alias Ref
112	Identification Encoder	Manages retrieval of information for items stored in source material library	2:30-33 6:58-62	Operator input of details about an item, called program notes, and a popularity code	Operator input terminal	6:39-43 8:42-45	Storage encoded data including unique identification codes, unique address codes, popularity codes, & program notes	Converter	6:58-62	Mandatory	6:35-39 7:48-50			
		Assigns unique identification codes to items	2:30-33 6:35-39	File address data	Operator input terminal or file system	6:48-52	Information, in the form of analog or digital, audio a/o video signals compatible with the inputs of the converter, retrieved from items stored in the library	Converter	2:33-36 6:58-62					
		May encode specific items as copy protected	5:36-39	Information, in the form of analog or digital signals compatible with the inputs of the converter, retrieved from items stored in a source material library	Source material library	2:30-33 6:62-64	Retrieved items in previously compressed form	Compressed data formatter	7:46-50					
		Performs storage encoding, which involves logging details about items (called item or program notes), production credits, and assigning a popularity code [i.e., metadata], also assigning unique address code	6:39-43, 10:58-61, 10:66-68, 12:28-30	Information, in the form of compressed digital signals compatible with the compressed data library	The compressed data library of another system	7:44-48	Item database records, such as program notes	Compressed data formatter	7:50-55					
		May perform storage encoding prior to conversion of items for transmission, any time after starting the conversion process, or after storing the items in the compressed data library	6:43-47				Mapping of item addresses to names & metadata collected during storage encoding process	Master item database	11:5-18					
		Associated w/items are file addresses, which are assigned as part of encoding process	6:48-52											
		Process of storage encoding is identical for any media type used in source material library	6:52-54											
		Can process inter-library transfers so that they then are able to be prepared by compressed data formatter for inclusion in compressed data library	7:48-50											
		Assigns unique address codes to items	10:58-61											
		Maps addresses to item names for use as alternative method of accessing items	11:5-7											
		Runs program that updates master item database containing facts regarding items in the compressed data library system	11:9-13											
		Through program enables system operator to access the master item database to track & describe items stored in one or more compressed data libraries	11:13-17											
		Through program enables updating of names and other facts in the item database	11:17-19											
113	Converter	Converts output from media in source material library into a predetermined format for further processing	6:55-58	Storage encoded data including unique identification codes, unique address codes, popularity codes, & program notes	Identification encoder	6:58-62	Least-significant-bit (lsb)-first, pulse code modulated (pcm) video a/o audio data in the form of a series of digital data bytes that represent frames of video data and samples of audio data	Time encoder	2:36-38 7:4-6 7:64-66 8:7-12 8:16-19	Optional if output from source material library matches input of rest of system	5:63-65 6:55-68		Conversion Means	6:56
		May follow identification encoding, but other options exist for placement of storage encoding	6:58-62	Information, in the form of analog or digital, audio a/o video signals compatible with the inputs of the converter, retrieved from items stored in the library	Source material library	7:35-39								
		Must be between source material library & other processes, with possible exception of storage encoding	6:58-62	Information, in the form of analog or digital, audio a/o video signals compatible with the inputs of the converter, retrieved from items stored in the library	Identification encoder	2:33-36 6:58-62 6:65-68								
		May include analog input receiver only	6:62-68											
		May include digital input receiver only	6:62-68											
		May include both analog & digital input receivers	6:62-68											

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ID	Name	Functional Description	Descr. Ref	Input	From	Input Ref.	Output	To	Output Ref.	Mandatory/ Inherently Required/Optional	M/IR/O Ref	Part of	Alias	Alias Ref
114	Time Encoder	Serves as ordering means to place formatted information into sequence of addressable data blocks	7:59-63	Least-significant-bit (lsb)-first, pulse code modulated (pcm) video a/o audio data in the form of a series of digital data bytes that represent frames of video data and samples of audio data	Converter	2:36-38 7:4-6 7:64-66 8:7-12 8:16-19	Audio a/o video data in the form of sequences of addressable data blocks with assigned relative time markers	Precompression processor	8:16-19 8:59-62	Optional in any particular transmission system, but one is inherently required somewhere	5:63-65 7:48-50 7:59-63		Ordering Means	19:4
		Time encoding occurs after conversion & formatting by the converter	7:64-66											
		Places blocks of converted information from converter into a group of addressable data blocks	7:66-8:1											
		Assigns relative time markers to audio & video data as it passes from converter to precompression processor	8:16-19											
		Time encoding applied in increments of frames	8:24-25											
115	Precompression Processor	Data arriving at input may be at various frame rates & of various formats	8:62-64	Audio a/o video data in the form of sequences of addressable data blocks with assigned relative time markers	Time encoder	8:16-19 8:59-62	Buffered & sample-rate-optimized audio & video data from sequences of addressable data blocks	Frame buffers for audio & video followed by compressors	9:22-25 9:33-37	If no compressor, optional; if compressor, buffer mandatory, the rest optional, depending on input match	5:63-65 7:48-50 8:62-64			
		Includes audio precompressor & video precompressor	8:64-66											
115a	Audio Precompression Processor	Buffers incoming audio data	9:26-29	Audio data in the form of sequences of addressable data blocks with assigned relative time markers	Time encoder	8:16-19 8:59-62 8:64-66	Audio data w/optimized sample rate & word length of constant rate & fixed length	Frame buffer followed by audio compressor	9:26-29 9:33-35	If no audio compressor, optional; If audio compressor, buffer mandatory, the rest optional, depending on audio input match	5:63-65 7:48-50 9:26-37	115	Audio Precompressor	8:65
		Optimizes sample rate & word length	9:29-33											
		May transcode incoming audio information	9:29-33											
		Outputs constant sample rate signal of fixed word length	9:33-35											
		Buffers audio data in frames	9:35-40											
		Packaging audio data in frames enables treatment of audio data as addressable packets	9:37-40											
115b	Video Precompression Processor	Buffers incoming video data	8:67-68	Video data in the form of sequences of addressable data blocks with assigned relative time markers	Time encoder	8:16-19 8:59-62 8:64-66	Video data w/converted frame rate, optimized sample rate, & fitted aspect ratio	Frame buffer followed by video compressor	8-67:9-2 9:4-8 9:9-12 9:22-25	If no video compressor, optional; If video compressor, buffer mandatory, the rest optional, depending on video input match	5:63-65 7:48-50 8:67-9:12	115	Video Precompressor	8:66
		Converts aspect ratio & frame rate as required by [video] compression processor	8:68-9:2											
		Processes incoming video data for sample rate optimization and aspect ratio fitting	9:4-6, 9:9-12											
		Can convert aspect ratio & apply a background around inactive region so no data is lost due to differences	9:12-18											
		Can convert aspect ratio using a best-fit arrangement [pan & scan]	9:18-22											
		Output stored in frame buffer	9:22-25											
116	Compressor	Compresses audio & video data in frames	9:41-42	Buffered & sample-rate-optimized audio & video data from sequences of addressable data blocks	Precompression processors for audio & video followed by frame buffers	9:22-25 9:33-37	Compressed audio a/o video data & time markers	Compressed data formatter	10:23-28	Optional in any particular transmission system, but one is inherently required somewhere	5:63-65 6:15-19 6:35-39 7:44-48		Compression Processor	9:1
		Comprises separate audio & video compressors	9:43-44										Data Compressor	9:4, 9:42, 9:45-46
		Enables shortened transmission time, faster access time, greater storage capacity, & smaller storage space	9:45-48											
		Requires multiple samples of data to perform optimum compression	9:48-50											
		Audio & video information organized into blocks of data & groups of blocks for compression	9:50-54											
		Blocks of data organized into frames, with multiple frames analyzed to optimize compression process	9:54-57											

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ID	Name	Functional Description	Descr. Ref	Input	From	Input Ref.	Output	To	Output Ref.	Mandatory/ Inherently Required/Optional	M/IR/O Ref	Part of	Alias	Alias Ref
117	Compressed Data Formatter	Compressed sequenced data with unique identification code stored as a file	10:17-22	Compressed audio a/o video data & time markers	Identification Encoder	7:44-50	Files containing audio a/o video data, time markers, & program notes	Compressed data library	10:23-28 12:65-68	Mandatory — used in all systems with compressed data library; some functions optional	7:44-58		Compressed Data Formatting Section	7:52, 7:58, 8:3-4
		Data received from data compression means	10:22	Compressed audio a/o video data & time markers	Compressor	10:23-28							Compressed Data Storing Means	10:19
		Compressed audio & video data is formatted & placed into a single file	10:23-26	Program notes	Identification encoder	6:44-47 10:26-28 12:65-68							Compressed Data Storage Means	10:26, 10:37-38
		Allows time realignment of audio & video information after separate precompression & compression	8:2-6											
		Can receive inter-library transfer materials from ID encoder	7:48-50											
		Can reformat item database records (metadata) from inter-library transfers to format compatible w/material stored in compressed data library	7:50-55											
117'	Short Term Storage	Receives input of digital material from inter-library transfers, as played back from digital tapes or received across communications channels	7:55-58	Material in previously compressed form	Other library systems	7:55-58	Material in previously compressed form	Compressed data formatter	7:48-50	Optional – only needed for inter-library transfers	5:63-65 7:44-58	117		
		Can pass received material to identification encoder, from which it is passed directly to compressed data formatter [due to ability of ID encoder to be located various places in system]	6:43-47, 7:48-50, 7:55-58	Item database records	Other library systems	7:50-55								
118	Compressed Data Library	Stores items prior to their being made accessible to users	6:35-39	Files containing audio a/o video data, time markers, & program notes	Compressed data formatter	10:36-39	Composite formatted data block of a requested item	Library access interface	13:34-37 13:45-47	Mandatory	6:35-39			
		More than one can store the same item	6:35-39	Direct user access requests using unique address code	User computer application via library access interface & system control computer	11:25-28 11:57-60 13:37-40	Composite formatted data block of a requested item	Transmission format means	13:40-45 15:55-60					
		Separately stores composite formatted data blocks for each of the files	10:31-34	Indirect user access requests via interactive systems	Remote order processing & item database via library access interface & system control computer	11:28-32 12-21-24 13:37-40 15:23-27								
		Provides storage for files created by compressed data storage means	10:36-39	Popularity code	Identification encoder	12:28-32								
		Can be a network of mass storage devices connected via a high speed network	10:39-42	Control commands	Library system control computer	11:54-57 13:23-28 15:23-27 15:33-37 15:47-54								
		Access to stored files available from multiple reception systems	10:42-45											
		Stored items accessed through unique address code	10:46-47											
		May employ mixed media storage for cost effectiveness in large libraries	12:35-37											
		Stored items dynamically moved to most appropriate media over their lifetimes in the compressed data library	12:40-42											
		Items retrieved more frequently by users stored on higher speed, more reliable, and probably more expensive media (e.g., Winchester & magneto-optical disks)	12:42-47											
		Items retrieved less frequently by users may be stored on digital cassette tape (e.g., Honeywell & Summus Jukebox or equivalent)	12:48-55											
		All items stored are on line & readily accessed through high speed network connections	12:55-57											
		May include program notes input by system operator (when remote order processing and item database not used)	12:58-61											
		Storage on multiple libraries may be dictated by popularity code	13:1-4											
		Copies of stored items can be sent between libraries for concurrent distribution from multiple libraries	13:4-8											
		Composed of network of storage devices connected through High Performance Parallel Interface (HPPI) Super Controller (available from Maximum Strategy Inc., San Jose, CA)	13.9-13											
		Multiple communication controllers can access the large quantity of data stored at very high speeds for transfer to user reception systems upon request	13:13-17											
		Use of HPPI controller allows file placement onto multiple mass storage devices with a minimum of overhead	13:21-23											
		Database management software controls the location and tracking of the library	13:23-28											

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ID	Name	Functional Description	Descr. Ref	Input	From	Input Ref.	Output	To	Output Ref.	Mandatory/ Inherently Required/Optional	M/IR/O Ref	Part of	Alias	Alias Ref
		Can be located across multiple clusters of file servers connected together by one or more high speed networks over multiple systems	13:23-28											
119	Transmission Format Means	Receives (user) request (from library access interface) & retrieves the composite formatted data block of the requested item stored in compressed data library	13:40-45	Transmission requests either direct from users or indirectly via remote order processing & item database	Library access interface	13:34-37 13:37-45	Requests for transfer of composite formatted data blocks of requested items	Compressed data library	13:40-45	Inherently required	13:13-17 13:40-45 15:55-60		Transmission Format Conversion CPU	Fig 2b
		Converts compressed formatted data block into format suitable for transmission	13:40-45	Composite formatted data blocks of requested items	Compressed data library	13:40-45 15:55-60 16:25-28	Composite formatted data blocks of requested items encoded for transmission on specific channel type	Transmitter	13:45-47 15:55-60 15:67-16:3				Transmission Data Converter	15:55-56
		Sends requested item to user via transmitter or via library access interface	13:45-47	Transmission task commands	Library system control computer	16:21-25							Transmission Format Converter	16:1-2
		Encodes data for the transmission channel	15:55-57										Transmission Encoding Computer	16:22, 16:23-24, 16:28
		Transfers desired segments of data from compressed data library onto the communication channel used to deliver the data to the reception system	15:57-60										Communications Controller	13:13 16:35 16:48-49 17:6 17:16-17
		Shares distributed management of transmission w/queue management [library system control] computer	16:20-25										Transmission Formatter (mislabeled 122)	
		Receives instructions from transmission queue management computer & executes assigned tasks independently	16:21-25											
		In two-way item distribution cases, receives reception confirmation from reception system for initial data block before transmission of remaining data blocks and of reception of all data blocks	17:1-7											
		In one-way item distribution cases, further redundancy included with the data blocks to permit error correction processing in reception system (alternatively could occur in Transmitter)	17:12-18											
121	Library Access Interface	Provides access to compressed audio a/o video data blocks along with any information about the item stored in the compressed data library or the library system control computer	11:54-60 13:34-37	Transmission requests	User applications	13:37-40	Search requests	Library system control computer	15:6-10	Inherently required	13:34-40 13:45-47 13:48-51		Interface	13:47
		Receives transmission requests directly from users or indirectly through remote order processing & item database	13:37-40	Transmission requests	Remote order processing & item database	13:37-40	Transmission requests	Library system control computer	15:23-27					
		May be used for sending requested item to user	13:45-47	Information about items stored in the compressed data library	Library system control computer	15:6-10	Composite formatted data blocks of requested items encoded & adapted for transmission on specific channel types	To the user, as an alternative to use of transmitter	13:40-47					
		Customer access of items may be performed in various ways [analogies made to making airline reservation and transferring funds between bank accounts]	13:48-51	Compressed audio a/o video data blocks	Compressed data library	13:45-47 13:48-51	List of available titles for display in alphabetical order	Reception system	17:44-46					
		User access may be provided w/telephone tone decoders & voice response hardware, w/operator assisted service, or through user terminal interfaces	13:57-60											
		Telephone tone decoders & voice response hardware are completely electronic — customer access may be between a system user and a computer order entry system	13:61-64											
		User assistance in ordering may be provided w/computer synthesized voice	13:64-66											
		Communicates a list of available titles for alphabetical display in a title window in the reception system	17:44-46											

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ID	Name	Functional Description	Descr. Ref	Input	From	Input Ref.	Output	To	Output Ref.	Mandatory/ Inherently Required/Optional	M/IR/O Ref	Part of	Alias	Alias Ref
122	Transmitter	May be used for sending requested item to user	13:45-47	Composite formatted data blocks of requested items encoded for transmission on specific channel types	Transmission data converter	13:45-47 15:55-60 15:67-16:3	Composite formatted data blocks of requested items encoded & adapted for transmission on specific channel types	Reception system via communications channel using common access lines	13:40-47 15:61-65 16:4-15 16:50-52 16:53-68	Optional when items are sent through Library Access Interface; inherently required when items are sent any other way	13:45-47 15:61-16:3		Transmission Formatter	17:16-17
		Coupled to compressed data library [through transmission format conversion CPU] for sending at least a portion of a specific file to at least one remote location	15:61-65, 15:57-60, Figure 2b				Composite formatted data blocks of requested items with error correction coding (ECC) & adapted for transmission on specific channel types	Reception system via one-way (broadcasting) channel such as a communications satellite	13:45-47 15:61-65 16:50-52 17:12-18					
		Operates with any available communications channels	15:65-67											
		Each channel type accessed through use of a communications adapter board or processor connecting the data processed in the transmission format converter to the transmission channel	15:67-16:3											
		Types of access lines / communications channels include standard telephone, ISDN, B-ISDN, microwave, DBS, cable television systems, Metropolitan Area Networks (MANs), high speed modems, or communications couplers	16:4-9, 16:62-68											
		Communications lines used to transmit compressed data at rates up to, typically, 10 Mb/s	16:14-15											
		To serve many different channel types, a multitude of output ports of each type connected to one or more computers on the system	16:16-20											
		May be located in transmission encoding computers	16:25-28											
		For standard telephone connection, transmitter is a modem	16:58-59											
		For ISDN channel, transmitter is a data coupler	16:59-61											
		In one-way item distribution cases, further redundancy included with the data blocks to permit error correction processing in reception system (alternatively could occur in Transmission Format Means)	17:15-18											
123	Analog-to-Digital Converter	Converts analog inputs to digital form at input to Converter	7:12-16	Analog audio & video information	Analog input receiver	6:65-66 7:12-16	Least-significant-bit (lsb)-first, pulse code modulated (pcm) audio & video data in a predetermined format	Time encoder	7:12-26 7:64-66	Optional – only needed when analog material is to be compressed	5:63-65 7:12-16 7:44-50	113	Converter	7:16
		Forms the digital data into bytes in same format as output of the (Digital) Formatter	7:16-18											
123a	Analog Audio Converter	Part of Analog-to-Digital Converter that applies identified functions to audio	7:19-20	Analog audio information	Analog input receiver	7:12-16	LSB-first PCM audio data in a predetermined format	Time encoder	7:20-23 7:64-66	Optional – only needed when analog audio is to be compressed	5:63-65 7:12-16 7:20-23 7:27-33 7:44-50	113, 123		
		Converts retrieved audio signals into PCM data samples at a fixed sampling rate	7:20-23											
123b	Analog Video Converter	Part of Analog-to-Digital Converter that applies identified functions to video	7:19-20	Analog video information	Analog input receiver	7:12-16	LSB-first PCM video data in a predetermined format	Time encoder	7:23-26 7:64-66	Optional – only needed when analog video is to be compressed	5:63-65 7:12-16 7:23-26 7:27-33 7:44-50	113, 123		
		Converts retrieved video signals into PCM data samples at a fixed sampling rate	7:23-26											
124	Digital Input Receiver	Converts digital inputs to proper voltage at input to Converter	7:1-4	Digital audio & video information	Identification encoder (when it follows Source Material Library)	7:1-4	Digital audio & video information with a proper voltage	Formatter	7:1-6	Optional – only needed when digital content is to be compressed	5:63-65 6:66-68 7:1-4 7:27-33 7:44-50	113		
		Only necessary when Converter inputs are digital	6:66-68	Digital audio & video information	Source Material Library (when identification encoder is placed elsewhere)	6:43-47, 7:35-43								
		Receives either audio-only or audio & video digital inputs	7:27-33											
		Simultaneous input of audio & video helps to maintain synchronization between audio & video	7:30-34											
125	(Digital) Formatter	Sets correct bit rates	7:4-6	Digital audio & video information	Digital input receiver	7:8-10	LSB-first PCM audio & video data in a predetermined format	Time encoder	7:4-6 7:10-11	Optional – only needed when content is to be compressed	5:63-65 6:66-68 7:1-6 7:44-50	113		
		Encodes data into LSB-first PCM	7:4-6											
		Outputs data in a predetermined format	7:10-11											
125a	Digital Audio Formatter	Part of (Digital) Formatter that applies identified functions to audio	7:4-6, 7:6-10, 7:10-11	Digital audio information	Digital input receiver	7:8-10	LSB-first PCM audio data in a predetermined format	Time encoder	7:4-6 7:8-11	Optional – only needed when digital audio is to be compressed	5:63-65 6:66-69 7:1-11	113, 125		

ID	Name	Functional Description	Descr. Ref	Input	From	Input Ref.	Output	To	Output Ref.	Mandatory/ Inherently Required/Optional	M/IR/O Ref	Part of	Alias	Alias Ref
125b	Digital Video Formatter	Part of (Digital) Formatter that applies identified functions to video	7:4-6, 7:6-10, 7:10-11	Digital video information	Digital input receiver	7:8-10	LSB-first PCM video data in a predetermined format	Time encoder	7:4-6 7:8-11	Optional – only needed when digital video is to be compressed	5:63-65 6:66-69 7:1-11	113, 125		
127	Analog Input Receiver	Provides input interface for analog signals from items in source material library	6:62-66	Analog audio & video information	Identification encoder (when it follows Source Material Library)	7:12-16	Analog audio & video information	Analog-to-digital converter	6:65-66 7:12-16	Optional – only needed when analog content is to be compressed	5:63-65 6:66-68 7:12-26	113		
		Only necessary when Converter inputs are analog	6:66-68	Analog audio & video information	Source Material Library (when identification encoder is placed elsewhere)	6:43-47, 7:35-43								
		Receives either audio-only or audio & video analog inputs	7:27-33											
		Simultaneous input of audio & video helps to maintain synchronization between audio & video	7:30-34											
128	Audio Compressor	Can be implemented using Adaptive Differential Pulse Code Modulation (ADPCM)	9:58-61	Buffered & sample-rate-optimized audio data from sequences of addressable data blocks	Precompression processor for audio followed by frame buffer	9:33-37	Compressed audio data & time markers	Compressed data formatter	10:23-28	Optional – only needed when audio information is compressed	5:63-65 7:27-29	116	Audio Data Compressor	9:43-44
		References APT-X 100 audio compression system from Audio Processing Technology	9:61-64										Compressor	7:47, 9:49
		Cites audio compression ratios of 8X or greater w/APT-X	9:64-65											
129	Video Compressor	Compression may be performed on a group of 24 frames	9:66-67	Buffered & sample-rate-optimized video data from sequences of addressable data blocks	Precompression processor for video followed by frame buffer	9:22-25	Compressed video data & time markers	Compressed data formatter	10:23-28	Optional – only needed when video information is compressed	5:63-65 7:30-33	116	Video Data Compressor	9:44
		Frames passed in sequence to frame buffer of video pre-compression processor	9:67-10:1										Compressor	7:48, 9:49
		Frames analyzed for purposes of data reduction	10:1-3											
		Compression algorithms provide greatest amount of data compression possible	10:4-7											
		Video compression involves two processes: Discrete Cosine Transform (DCT) & motion compensation	10:7-9											
		References monograph "A Chip Set Core of Image Compression," by Artieri & Colavin of SGS-Thomson Microelectronics	10:10-11											
		Multiple frames analyzed for patterns in horizontal, vertical, diagonal (zigzag), & time dimensions	10:11-14											
		By finding repetition in video data, redundancy can be removed and video data compressed w/minimal loss of information	10:14-16											
130	(Audio) Frame Buffer	Buffers audio data having constant sample rate & fixed word length	9:33-35	Audio data w/optimized sample rate & word length of constant rate & fixed length	Audio pre-compression processor	9:26-29 9:33-35	Pre-compression processed audio data	Audio compressor	9:35-37	If no audio compressor, optional; If audio compressor, mandatory	5:63-65 9:33-37	115a	Buffer	9:28, 9:56
		Dual ported	9:35-37											
		Directly addressable by audio compressor	9:35-37											
		Stores a number of frames of audio data	9:54-56											
131	(Video) Frame Buffer	Holds all incoming [video] data until the data is compressed by the data compressor	9:2-4	Incoming video data	Time encoder	8:59-62 8:67-9:2	Incoming video data	Pre-compression processor	9:2-4	If no video compressor, optional; If video compressor, mandatory	5:63-65 9:2-8	115b	Buffer	9:6, 9:56
		Buffers sample-rate-optimized & aspect-ratio-adjusted video data for compression processing	9:4-8	Video data w/converted frame rate, optimized sample rate, & fitted aspect ratio	Video pre-compression processor	8:67-9:2 9:4-8 9:9-12 9:22-25	Pre-compression processed video data	Video compressor	9:22-25					
		Dual ported	9:22-25											
		Directly addressable by video compressor	9:22-25											
		Stores a number of frames of video data	9:54-56											

ID	Name	Functional Description	Descr. Ref	Input	From	Input Ref.	Output	To	Output Ref.	Mandatory/ Inherently Required/Optional	M/IR/O Ref	Part of	Alias	Alias Ref
200	Reception System	Each associated w/single transmission system	3:65-68	Compressed formatted data blocks	Transmission system	2:62-3:3	Decompressed material	A single user	4:22-25 Figure 1e	Inherently required	3:50-4:63		Receiving System	6:32, 8:40, 8:42
		Each may communicate w/plurality of users	4:11-13	Compressed formatted data blocks	A single transmission system	3:61-68 Figure 1a	Decompressed material	A plurality of users	4:11-13 4:14-18 Figure 1d					
		May be configured as a cable television system	4:14-18	User interactions	A plurality of users	4:11-13	Decompressed material delayed in time from reception	Users connected via a cable television system	4:37-41 Figure 1f					
		May be non-buffering, decompressing in real time	4:34, 4:68-5:3				Decompressed material	Cable television system headend	4:44-49 Figure 1f					
		May be buffering, allowing delivery of material at a delayed time	4:39-43, 4:68-5:3				Decompressed material	Airwave channel transmitter (VHF, UHF, or satellite)	4:52-57 Figure 1g					
		In indirectly connected systems, may include intermediate storage device	5:22-26				Decompressed material decoded in real time as received	Users with reception systems directly connected to the transmission systems	4:68-5:3					
		May combine buffering & non-buffering operation	5:3-9				A combination of material delayed in time from reception and material decoded in real time as received	Users with reception systems directly connected to the transmission systems	5:3-9					
		May be located at headend of cable television system	4:44-46				Copy protected analog output signals	Analog television sets and analog audio/video recorders	5:46-52					
		May output standard television signals for delivery through cable systems to users with only cable television decoders and standard television receivers	4:46-51				Copy protected digital output signals	Digital audio/video recorders	5:52-58					
		May output signals for retransmission over airwave communication channels on VHF, UHF, or satellite	4:52-63											
		May apply copy protection to specific items	5:39-45											
		Real-time output signals are output to a playback system such as an audio amplifier a/o television	17:25-26, 18:36-37											
		Output may be sent to audio/video recorder for more permanent storage & future multiple playbacks	17:27-28, 18:37-38, 18:41-45											
		Only non-copy-protected data can be recorded on an audio/video recorder	17:28-30											
		Any copy-protected material scrambled at video output in a way that makes it viewable on a standard audio/video receiver but does not allow for recording the material	17:30-34											
		Has playback controls similar to controls available on standard audio/video recorder	17:35-37											
		Playback controls may include play, fast forward, rewind, stop, pause, and play slow	17:37-38											
		User may utilize stop, pause, and multiple viewing functions of of reception system/receiving device	18:38-41											
		Since items may be stored on random access media, fast forward & rewind functions are simulations of what takes place on an actual audio/video recorder	17:38-41											
		Fast motion modes do not tear, as on a conventional audio/video recorder, but, in fast play modes, go by very quickly	17:42-43											
		Responsive to user requests for information stored in source material library	18:1-3											
200c	Intermediate Storage Device	Buffers material within reception system	4:41-43	Compressed formatted data blocks	Receiver format converter	18:17-19	Compressed formatted data blocks	Data formatter	18:22-23	Optional	5:23-26			
201	Transceiver	Receives audio a/o video information transmitted by a transmitter in the transmission system	18:3-6	Composite formatted data blocks of requested items encoded & adapted for transmission on specific channel types	Transmission system via communications channel using common access lines	16:4-15 16:50-52 16:53-68	Compressed formatted data blocks	Receiver format converter	18:9-13	Inherently required	18:3-6			
		Automatically receives the information from the transmitter as compressed formatted data blocks	18:6-8	Composite formatted data blocks of requested items with error correction coding (ECC) & adapted for transmission on specific channel types	Transmission system via one-way (broadcasting) channel such as a communications satellite	16:50-52 17:12-18								
		May be connected to receiver format converter	18:9-10											
202	Receiver Format Converter	May receive compressed formatted data blocks from transceiver	18:6-10	Compressed formatted data blocks	Transceiver	18:9-13	Compressed formatted data blocks formatted for playback by the user	Storage	18:17-19	Inherently required	18:10-13			
		Converts compressed formatted data blocks into format suitable for playback by user in real time	18:10-13											

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ID	Name	Functional Description	Descr. Ref	Input	From	Input Ref.	Output	To	Output Ref.	Mandatory/ Inherently Required/Optional	M/IR/O Ref	Part of	Alias	Alias Ref
203	Storage	Enables buffering of requested material for later viewing	4:37-51 4:68-5:3	Compressed formatted data blocks formatted for playback by the user	Receiver format converter	18:17-19	Compressed formatted data blocks formatted for playback by the user	Data formatter	18:22-23	Optional	18:14-21			
		Enables a combination of buffering and non-buffering operation	5:3-9				Compressed formatted data blocks formatted for playback by the user	Compressed data output	Figure 6					
		Enables storage of audio & video for viewing by users at times of their choosing	5:22-31											
		Stores compressed formatted data blocks for playback of item by user at a time later than originally requested, when desirable	18:14-19											
		Allows for temporary storage of requested item until playback is requested	18:19-21											
		Sends compressed formatted data blocks to data formatter when playback is requested	18:22-23											
		Buffers information so that it may be stored by the user for future viewings	19:30-34											
204	Data Formatter	Receives compressed formatted data blocks when playback is requested	18:22-23	Compressed formatted data blocks formatted for playback by the user	Storage	18:22-23	Separated audio information	Audio decompressor	18:27-29	Inherently required	18:22-26			
		Processes compressed formatted data blocks & distinguishes audio information from video information	18:23-26				Separated video information	Video decompressor	18:27-29					
205	Decompression	Comprises video decompressor & audio decompressor	18:27-29	Separated audio & video information	Data formatter	18:27-29	Decompressed audio & video data	Output format conversion	18:29-34	Inherently required	18:27-29			
206	Output Format Conversion	Comprises digital video, analog video, digital audio, & analog audio output format converters	Figure 6	Decompressed audio a/o video	Decompression	18:29-34	Real-time audio a/o video	Playback system such as TV or audio amp	18:34-37	Inherently required – but individual outputs optional	7:27-34 18:29-34			
		Decompressed video & audio data sent simultaneously to all output format converters	18:29-34				Real-time audio a/o video	Audio/video recorder	18:37-38					
		Outputs from all converters produced in real time	18:34-35											
	Compressed Data Port	Connects external devices such as a digital recorder for offline storage to the compressed output of Storage	5:56-58 Figure 6	Compressed audio, video, & other data	Storage subsystem	5:56-58 Figure 6	Compressed audio, video, & other data	External devices such as digital recorder	5:56-58 Figure 6					
		Copy protected items not passed to port output	5:56-58											
207	User/Computer Interface	May be used as an ordering method for providing customer access to stored items	13:51-60	Data stored in item database master copy	Library system control computer or remote order processing & item database	11:57-60 17:51-53	Listing of contents of item database in title window	Users via application programs	11:57-60 17:44-53	Optional – other methods are available for obtaining info & placing orders	13:48-14:2 14:49-63 14:64-15:1		User Terminal Inteface	15:6
		May include a title window where a list of available titles is presented alphabetically	17:44-46	Updated database information	Item database master on library system control computer	11:62-65	User interactions with database listing	Library system control computer or remote order processing & item database	11:54-60 14:64-15:1					
		Window has two modes: local listing of material contained within library system control computer and library listing for all available titles that may be received from remotely accessible libraries	17:46-50	Database search responses	Library system control computer or remote order processing & item database	15:4-10 17:46-50								
		Titles listed in window sent from database on library system control computer or on remote order processing & item database	17:51-53	User interactions with database listing	Users via application programs	11:57-60 14:64-15:1								
208	Video Decompressor	Decompresses separated video information	18:27-29	Separated video information	Data formatter	18:27-29	Decompressed video data	Output format conversion - video	18:29-32	Optional – but inherently required if video is processed	7:27-34 18:27-29	205		
209	Audio Decompressor	Decompresses separated audio information	18:27-29	Separated audio information	Data formatter	18:27-29	Decompressed audio data	Output format conversion - audio	18:32-34	Optional – but inherently required if audio is processed	7:27-34 18:27-29	205		
211	Digital Video Output Converter	Converts decompressed video information to real time digital video output	18:29-35	Decompressed video data	Video decompressor	18:29-32	Real-time digital video	Playback system such as TV	18:34-37	Optional – but inherently required if digital video output is needed	7:27-34 18:29-32	206		
		Copy protection signaled to compatible recording devices by setting copy protect bit in output signal	5:46-49 5:52-56				Real-time digital video	Audio/video recorder	18:37-38					
212	Digital Audio Output Converter	Converts decompressed audio information to real time digital audio output	18:29-35	Decompressed audio data	Audio decompressor	18:32-34	Real-time digital audio	Playback system such as TV or audio amp	18:34-37	Optional – but inherently required if digital audio output is needed	7:27-34 18:32-34	206		
							Real-time digital audio	Audio/video recorder	18:37-38					
213	Analog Video Output Converter	Converts decompressed video information to real time analog video output	18:29-35	Decompressed video data	Video decompressor	18:29-32	Real-time analog video	Playback system such as TV	18:34-37	Optional – but inherently required if analog video output is needed	7:27-34 18:29-32	206		
		Copy protection obtained through use of irregular sync signals that allow viewing but not recording	5:46-52				Real-time analog video	Audio/video recorder	18:37-38					

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ID	Name	Functional Description	Descr. Ref	Input	From	Input Ref.	Output	To	Output Ref.	Mandatory/ Inherently Required/Optional	M/I/R/O Ref	Part of	Alias	Alias Ref
214	Analog Audio Output Converter	Converts decompressed audio information to real time analog audio output	18:29-35	Decompressed audio data	Audio decompressor	18:32-34	Real-time analog audio	Playback system such as TV or audio amp	18:34-37	Optional – but inherently required if analog audio output is needed	7:27-34 18:32-34	206		
							Real-time analog audio	Audio/video recorder	18:37-38					
300	Remote Order Processing & Item Database	Enables users to access desired items by remote communication	4:5-7	Changes to master item database	Master item database or program in identification encoder that updates the database	11:19-21	Copies of the item database	User displays or other forms of presentation	11:66-12:4	Optional – other methods are available for obtaining info & placing orders	11:25-39 11:54-62 12:58-68 13:48-14:2 14:49-63 14:64-15:1			
		May communicate with a plurality of transmission systems	5:7-8	Indirect user access requests to compressed data library	Synthesized voice system, query type computer program interface, or customer assistance operators	11:28-32 12:21-24	User requests	Library system control computer via library access interface	11:66-12:4 12:21-27 13:37-40 15:23-27					
		May be periodically updated with changes made to the master item database	11:19-21	Interactive inputs from users seeking to locate & order items	User terminals or applications	12:8-15 14:64-15:2	Interactive information to users to aid in locating & ordering items	User terminals or applications	12:8-20 15:3-22 17:51-53					
		Provides users with indirect access to items in the compressed data libraries	11:25-32	Interactive inputs from users seeking to order items	Telephone touch pads	14:3-48	Interactive information to users to aid in ordering items	Telephone instruments	14:3-48					
		Makes indirect access to items in compressed data libraries through synthesized voice system, query type of computer program interface, or customer assistance operators	11:28-32	Interactive inputs from customer assistance operators	Computer terminals	14:49-63	Interactive information to customer assistance operators	Computer terminals	14:49-63					
		May be supplemented with a published catalog to provide unique address codes to users, thereby avoiding need for an interactive system	11:32-39				Order information	Library system control computer via library access interface	15:23-27					
		May make copies of item database available to users	11:66-12:4											
		Batch processes & downloads user requests to control computer	11:66-12:4											
		Downloads user requests to control computer through standard or high speed communications channels	11:66-12:4											
		Multiple instances make possible order processing at more locations than there are library facilities, thereby making order processing more efficient	12:4-7											
		Can provide key word search capability, with hits reported to user and selection made from among them	12:8-21											
		Selections sent to system control computer	12:21-24											
		Selection data includes user address, item address, and optional frame numbers and desired viewing time	12:24-27											
		For user access via telephone tone decoders & voice response hardware, runs application that implements Access Process — Telephone Tone Decoders & Voice Response Hardware described in flowchart of Figure 3 [& detailed in section by that name below]	14:3-6											
		For user access using operator assistance, runs application that supports Access Process — Operator Assisted Service described in section by that name below	14:49-63											
		For user access via terminal interface, runs application that implements Access Process — Terminal Interface Method described in flowchart of Figure 4 [& detailed in section by that name below]	14:64-15:2											
		To complete an order, may connect to compressed data library of choice through its library access interface, communicating with that library's library system control computer	15:23-27											
		May pass to library system control computer of chosen library the user account ID, identification of the item for transmission, and the chosen destination for the item	15:27-29											

ID	Name	Functional Description	Descr. Ref	Input	From	Input Ref.	Output	To	Output Ref.	Mandatory/ Inherently Required/Optional	M/IR/O Ref	Part of	Alias	Alias Ref
1123	Library System Control Computer	Receives user selection requests via downloads from remote order processing & item database subsystems	11:66-12:4, 12:21-24	Item database entries (for master copy)	Compressed data library	11:55-57	Data stored in item database master copy	Users via application programs	11:57-60 17:51-53	Inherently required	11:54-57 11:57-60 12:21-24 15:33-35		Control Computer of Compressed Data Library	12:1-2
		Selection data includes user address, item address, and optional frame numbers and desired viewing time	12:24-27	User requests	Remote order processing & item database	11:66-12:4	Updated database information	Copies of item database	11:62-65				Transmission Queue Computer	16:24-25
		May hold item database master, keeping it updated and current w/contents of compressed data library	11:54-57	Requests to distribution manager program for transmission of a particular item	Remote order processing & item database	12:21-24	Database search responses	Users via user terminal interface	15:4-10 17:46-50					
		May run application program enabling user access to data in item database master in conjunction w/application running on reception system	11:57-60	Database search requests	Users via user terminal interface	15:4-10	Control outputs for distribution of requested items to reception systems	Compressed data library & transmission data converter	15:35-37 15:43-46					
		Can accept connections from users to item database master over any available telecommunications channel	11:60-62	Order entry information	Remote order processing & item database via library access interface	15:23-27	Confirmation of reception by reception systems	Billing program	17:9-11					
		Can select individual songs from compressed data library for transmission to receiving system	8:37-42	Transmission requests	Access methods	15:33-35								
		Receives from remote order processing & item database(s), through the library access interface for the library it controls, user account IDs, identification of items for transmission, and the chosen destinations for those items	15:23-29	Confirmation of reception by reception systems	Communications controller	17:7-9 17:19-23								
		Manages a transmission queue	15:33-35											
		Runs a distribution/queue manager program to control distribution of requested items to the reception systems of users	12:21-24 15:35-37, 17:19-22											
		Shares distributed management of transmission w/transmission encoding computer	16:20-25											
		Issues instructions to transmission encoding computer, which then executes assigned tasks independently	16:21-25											
		Indicates to file server [in compressed data library] the data to be transferred to transmitter(s) in one or more transmission encoding computer(s)	16:25-28											
	Access Process — Operator Assisted Service	User access can be provided through assistance of telephone operators who answer calls from users	14:49-51											
		Operators sign up new customers, take orders, & help w/billing problems	14:51-52											
		Operators may use computer terminals that provide access to account information & available program information	14:52-55											
		Operators can assist users in determining titles by looking up information stored in files that may contain program notes	14:55-58											
		After user chooses program, operator informs user of price	14:58-59											
		After user confirms order to operator, user indicates desired delivery time & destination	14:59-61											
		After user indicates desire delivery time & destination, operator enters user request into system	14:61-62											
		After operator enters user request into system, request placed in transmission queue	14:62-63											

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ID	Name	Functional Description	Descr. Ref	Input	From	Input Ref.	Output	To	Output Ref.	Mandatory/ Inherently Required/Optional	M/IR/O Ref	Part of	Alias	Alias Ref
	Access Process — Telephone Tone Decoders & Voice Response Hardware	Process performed by remote order processing & item database subsystem to enable customer access using telephone tone decoders & voice response hardware may consist of following steps from Figure 3	14:3-6											
		User calls system access number	14:6-7											
		Upon successfully connecting, user receives instructions from system. Instructions may include steps user must take to place order. Instructions may be bypassed by experienced users.	14:7-13											
		User enters customer ID code to enable system access to account	14:14-17											
		System confirms that user account is in good standing	14:17-19											
		If user account in good standing, system instructs user to input request	14:19-21											
		User selection may be made from a catalog sent to subscribers. User identifies choice & enters corresponding identification code for the item	14:22-26											
		System confirms user selection & informs user of price of the selection	14:26-28											
		User indicates correctness of confirmed information	14:29-30											
		If user indicates confirmed information was correct, user so indicates	14:30-33											
		If user does not find confirmed information to be correct, user re-inputs item identification code, and the confirmation steps are repeated until user confirms determines confirmation to be correct, thereby assuring correct selection	14:34-38											
		Once user determines the confirmed information to be correct, user then may input a desired delivery time & delivery location	14:30-33, 14:39-40											
		User then confirms entire transaction including selected item(s), selected playback time (if any), & playback location	14:41-45											
		Transaction is completed & request is placed on transmission queue at appropriate compressed data library	14:45-48											
	Access Process — Terminal Interface Method	User access with the Terminal Interface Method can enable access via various terminal types including personal computers & specialized interfaces built into the reception system for the user	14:64-67											
		Terminal Interface Method allows user to search available programs from a computer screen	14:67-15:1											
		Process may consist of following steps from flowchart of Figure 4	15:1-4											
		User logs onto user terminal interface	15:4-6											
		After logging on, user may select a desired item by searching database of available titles in the library system control computer or any remote order processing & item database	15:6-10											
		Search may be performed using the database containing the program notes	15:10-13											
		Orders may be processed & database operated at multiple remote locations	15:13-15											
		Both users & order processing operators may access the remote systems and place transmission requests from these systems	15:16-18											
		Orders placed on remote systems will be processed & delivered to the appropriate libraries	15:18-20											
		After desired item is found, user may select item for transmission at a specific time & to a specific location	15:20-22											

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ID	Name	Functional Description	Descr. Ref	Input	From	Input Ref.	Output	To	Output Ref.	Mandatory/ Inherently Required/Optional	M/IR/O Ref	Part of	Alias	Alias Ref
	Block Structure of Data	Video frame is composed of a plurality of video samples	19:40-43, Figure 8a											
		Second of video is composed of a plurality of video frames	19:40-43, Figure 8a											
		Audio data frame is composed of a plurality of audio samples	19:44-47, Figure 8b											
		Second of audio is composed of a plurality of audio frames	19:44-47, Figure 8b											
		Data frame is composed of a plurality of data bytes	19:48-49, Figure 8c											
		Combination of audio frames, video frames, and data frames comprises an item	19-49-51, Figure 8d											
		Each item may have its own arrangement of audio, video, & data frames in a multiplexed sequence	19:51-56, Figure 8d											
		Signal paths for distribution to reception systems may be both multiplexed and non-multiplexed	19:57-60, Figure 8e											
		Blocks of items distributed to reception systems may be both addressed and non-addressed	19:57-60, Figure 8e											
		A block of an item may be an entire item or only a portion of an item, as selected by user	19:60-62											
		Blocks may be composed of data that is compressed, partially compressed, or fully decompressed, as required by the configuration of the reception system	19:62-65											
		The same block may be transmitted simultaneously over different distribution channels	19:66-68, Figure 8e											
		Blocks transmitted over a particular distribution channel may have receiver addresses appended to the blocks, or the reception system may be preconfigured to receive the blocks comprising data frames for particular items from the active distribution channel	19:68-20-5											
	Catalog	May be published to provide to users lists of available titles	11:32-35											
		Can associate unique address codes w/lists of titles, thereby allowing retrieval from compressed data libraries without use of interactive system	11:35-39											
	Copy Protection	May be applied to analog and digital outputs of reception systems	5:46-48											
		For analog outputs, use of irregular sync signals allows viewing without recording [i.e., Macrovision]	5:48-52											
		For digital outputs, a bit is set to instruct compatible digital recorders not to record the content [comparable to R-DAT]	5:52-56											
		For compressed data port outputs, no output when item is copy protected	5:56-58											
	Dispatching Control Software	Receives input from remote order processing & item database	17:54-57											
		Sends distribution requests to distribution systems	17:54-57											
		When not all items contained in all compressed data libraries, keeps a list of available titles in particular compressed data libraries	17:57-61											
		Can coordinate network traffic, source material library utilization, source material library contents, & connection costs	17:61-64											
		Through factoring of variables, optimizes efficiency of distribution channel utilization	17:64-66											

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ID	Name	Functional Description	Descr. Ref	Input	From	Input Ref.	Output	To	Output Ref.	Mandatory/ Inherently Required/Optional	M/IR/O Ref	Part of	Alias	Alias Ref
	Distribution Method	A method for distributing items from the transmission system to the reception system may consist of following steps from Figure 7	18:46-47, Figure 7											
		Responds to requests identifying information to be sent from transmission system to remote locations	18:47-50											
		Assumes that items are initially stored in compressed data library, then await a request for transmission	18:50-52											
		Upon request by a user, information for selected items is retrieved from source material library (analogous to taking books off a shelf in a public library after deciding what to read)	18:53-59											
		After retrieving information for selected items, information is processed for efficient transfer, as in following steps	18:60-63											
		The identification encoder assigning a unique identification code to the retrieved information	18:63-68											
		The converter converting the information into a predetermined format	18:68-19:4											
		The ordering means placing the formatted data into a sequence of addressable data blocks	18:68-19:4											
		The compressor compressing the formatted and sequenced data	19:5-10											
		Storing as a file the compressed sequenced data with an assigned unique identifier	19:5-10											
		Storing the file in a large capacity compressed data library	19:11-17, Figure 7											
		After storing the file in the high capacity compressed data library, waiting to receive a transmission request	19:18-20											
		After receiving a transmission request, converting the compressed formatted data for output over a specific type of communications channel to a reception system selected by the user	19:21-24											
		Transmitting the information over an existing communications channel to a reception system	19:24-27											
		Receiving the information from the communications channel by the reception system and formatting the data for use by that particular type of reception system	19:27-29											
		Buffering the information in the reception system using a storage means that enables storage by the user for possible future viewings	19:30-34											
		Playing back the requested information through the reception system at the time requested by the user	19:34-36											
	File	Has an address to permit locating it	6:48-52											
		Stores compressed sequenced data	10:17-22											
		Has associated unique identification code	10:17-22											
		Single file may contain both compressed audio & compressed video data	10:23-26											
		May contain compressed audio a/o video data, time markers, & program notes.	10:26-28, 11:40-44 12:65-68											
		Addressable through unique identification code assigned by identification encoder	10:28-30											
	Inter-Library Transfer	Processes previously compressed material without need for precompression processors and compressors	7:44-48											
		Retrieved items passed directly from identification encoder to compressed data formatter	7:48-50											
		Metadata is reformatted, if necessary, to make it compatible with material already stored on system	7:50-55											
		Material may be received in form of digital tapes or via existing communications channels & input to short term storage before transfer to compressed data library	7:55-58											

ID	Name	Functional Description	Descr. Ref	Input	From	Input Ref.	Output	To	Output Ref.	Mandatory/ Inherently Required/Optional	M/IR/O Ref	Part of	Alias	Alias Ref
	Item	May include analog & digital audio & video information as well as physical objects	6:2-4											
		Physical objects require conversion to media type compatible w/system before converting, compressing, & storing audio & video data representing them in the compressed data library	6:4-7											
		Must be given identification code & stored in at least one compressed data library prior to being made accessible to users	6:35-39											
		May be stored on multiple compressed data libraries when dictated by popularity code	13:1-4											
		When stored on multiple compressed data libraries, copy of compressed data is transferred between libraries for distribution to users concurrently from multiple libraries	13:4-8											
	Item Database	May contain information records for individual frames or groups of frames	8:45-47	Mapping of item addresses to names & metadata collected during storage encoding process	Identification encoder	11:5-18	Database information & changes to the database	Remote order processing & item database	11:19-21				Master Item Database	11:11-12, 11:15, 11:19-20
		Individual frames or groups of frames can represent still frames, chapters, songs, book pages, etc	8:47-48										Item Database Master	11:54
		May include item notes and production credits, which comprise the title, names of the creators of the item, and other details that may be of interest and that may make items more accessible	10:66-11:4											
		Changes made to database may be periodically sent to remote order processing & item database(s)	11:19-21											
		Facts about items may be kept in files as part of items	11:40-44											
		Facts about items may be kept separately, e.g., by systems that inform users of available items & that also take orders	11:40-44											
		Facts about items may be separated from items themselves & stored in separate files	11:44-47											
		Multiple versions may reside on multiple database servers, in catalogs, & on other computer systems	11:50-53											
		Master may reside on system control computer	11:54-57											
		Master may be updated & kept current w/contents of compressed data library	11:54-57											
		Data stored in master may be accessed by users via application programs running on system control computer & on reception systems of users	11:57-60											
		May be accessed by users via any available communications channels	11:60-62											
		Updating & inclusion of new entries into compressed data library may be scheduled at periodic intervals by system manager	11:62-65											
		Copies may be made available to users by remote order processing & item database	11:66-12:4											
	Playback Controls	Part of reception system	17:35-37											
		Similar to the controls available on a standard audio/video recorder	17:35-37											
		Include play, fast forward, rewind, stop, pause, & play slow	17:37-38											
		Fast forward & rewind functions are simulations of the actual events that occur on a standard audio/video recorder	17:38-41											
		Frames do not tear, as on a standard a/v recorder, but go by quickly	17:42-43											
	Popularity Code	Assigned by identification encoder	6:39-43, 12:28-30											
		Assigned on basis of expected utilization of corresponding item in terms of number of requests	12:30-32											
		Can be used to determine most appropriate form of storage media for each item in a mixed-media compressed data library	12:32-35											
		After initial assignment, can be dynamically updated by factoring item usage against system usage	12:38-40											
		When multiple compressed data libraries are organized, may dictate distribution of a particular item to multiple distribution systems	13:1-4											

ID	Name	Functional Description	Descr. Ref	Input	From	Input Ref.	Output	To	Output Ref.	Mandatory/ Inherently Required/Optional	M/IR/O Ref	Part of	Alias	Alias Ref
	Program Notes	Comprises details about items & stored as part of item database	6:39-43, 11:40-53											
		Optionally collected during storage encoding performed by identification encoder	6:39-43, 6:48-52											
		May be included in inter-library transfers along with compressed content data	7:50-55											
		During inter-library transfers, may be passed to compressed data formatting section to be reformatted for compatibility w/material stored in the compressed data library of the system receiving the transfer	7:50-55											
		May be included in files containing item content, along with video & audio data and time markers	10:26-28											
		May be included in files in compressed data library, in particular, when remote order processing & item database is not used	12:58-61											
		May include title of item stored in compressed data library, chapter or song titles, running times, credits, the producer of the item, acting & production credits, & the like	12:61-65											
		When stored in the compressed data library, may be contained in compressed data files formed in the compressed data formatter	12:65-68											
		Can be used by customer assistance operators to aid user selection of items for ordering	14:52-58											
		Users may search database containing program notes on system control computer or on any remote order processing & item database	15:6-13											
	Queue Manager Program	Controls distribution of requested items to the reception systems of users	15:35-37											
		Runs on the library system control computer	15:38-43											
		Keeps track of user ID, chosen program and price, user channel type, number of requests for a given program, latest delivery time, and compressed data library media type (e.g., high or low speed)	15:38-43											
		From this information, makes best use of available distribution channels and media for efficient transmission & storage of requested items	15:43-46											
		Manages file transmission process for multiple requests for a single file stored in the associated compressed data library	15:47-49											
		Optimizes access to the associated comressed data library, over a given time period, by placing data on multiple outputs for simultaneous transmission to multiple requesting users	15:49-54											
		Process performed by queue manager program to manage the distribution process may consist of following steps from Figure 5	16:29-31											
		Confirms availability of an item from the compressed data library	16:31-36											
		Logically connects item stored in the compressed data library to the communications controller [transmission encoding computer]	16:31-36											
		After availability confirmed, data awaits transmission by transmitter	16:36-37											
		After availability confirmed, communications controller makes physical connection to reception system of user, typically by dialing receiving device of user	16:38-42											
		Reception system answers incoming connection request & confirms connection	16:42-44											
		Once connection established, data stored in compressed data library transferred in data blocks from the compressed data library to the communications controller	16:45-49											
		Data blocks are buffered by communications controller	16:49-50											
		Buffered data sent down communications channel to reception system by transmitter	16:50-52											
		Transmitter places formatted data onto communications channel, using electrical conversion to an output format that depends on the chosen communication path	16:53-56											
		Signal sent to reception system in either a two-way or one-way communication process, depending on type of communication channel in use	16:56-58											

ID	Name	Functional Description	Descr. Ref	Input	From	Input Ref.	Output	To	Output Ref.	Mandatory/ Inherently Required/Optional	M/IR/O Ref	Part of	Alias	Alias Ref
		Whenever possible, reception system confirms reception of initial data block before receiving remaining data blocks	17:1-4											
		Remaining data blocks are transferred	17:1-4											
		Reception of all data blocks confirmed	17:4-7											
		Communications controller breaks physical connection to reception system	17:4-7											
		Confirmation of transmission sent to queue manager	17:7-9											
		Queue manager updates dispatch list and sends information to the billing program, which update user account	17:9-11, 17:23-24											
		When distribution is over a one-way channel, such as broadcasting or a communications satellite, on-going reception is not confirmed by reception system	17:12-15											
		In one-way communications situations, queue manager program confirms reception after distribution, e.g., using telephone line connection to reception system	17:19-23											
		Confirmation of reception in one-way communications situation should occur prior to updating user's account & dispatch lists	17:23-24											
	Requested Material	Prior to transmission, may be fully compressed & encoded, partly decompressed at some stage in transmission system, or fully decompressed	4:64-68											
		May be copy protected for both analog and digital output signals	5:46-48											
	Storage Encoding	Copy protection encoded for items for to be protected upon output from reception systems	5:34-39 5:46-48											
		Assigns or collects metadata about items, including unique identification code, item details (program notes), and a popularity code	6:39-43											
		Unique identifier is mandatory	6:35-39											
		Program notes & popularity code are optional	6:39-43											
		May be performed prior to conversion of item for transmission, after starting conversion process, or after storing item in compressed data library	6:43-47											
		Can include assignment of file addresses to items	6:48-52											
		Process identical for any media types stored in source material library	6:52-54											
		Can associate content frames or groups of frames w/content elements (e.g., songs, book pages) stored within the context of content items (storage units)	8:42-50											
		Assigns unique address code to data to make it addressable	10:28-30											
		Allows entry of item notes & production credits	10:66-68											
	System Operator	Indexes starting frame numbers of songs through storage encoding process	8:42-45											
		Assigns unique address codes to items during storage encoding	10:58-61											
		May use storage encoding process to access the master item database to track and describe items stored in one or more compressed data libraries	11:13-17											
		Inputs program notes (through identification encoder & storage encoding process)	10:66-68, 12:58-61											

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ID	Name	Functional Description	Descr. Ref	Input	From	Input Ref.	Output	To	Output Ref.	Mandatory/ Inherently Required/Optional	M/IR/O Ref	Part of	Alias	Alias Ref
	Time Encoding	Performed by time encoder	7:62-63											
		Preferred addressing scheme	8:1-2											
		Allows realignment of audio & video information in compressed data formatter after separate audio & video compression processing by the precompression processor & the compressor	8:2-6, 8:20-23											
		Signals are input & encoded in sequence, starting w/first & ending w/last frame of video data and starting w/first & ending w/last sample of audio data	8:12-16											
		Assigns relative time markers to audio & video data as it passes from converter, through time encoder, to precompression processor	8:16-19											
		Enables system addressing of particular data bytes & user addressing of particular portions of items	8:20-23											
		Applied with granularity of frames of video a/o audio	8:24-26											
		Once frames of video or audio are identified by time code, data can be broken down to individual bytes through use of frame structures applied to the data	8:26-31											
		Makes items & subsets of items retrieveable & addressable throughtout transmission system	8:50-52											
		Enables subsequent compression of information to be improved by employing data reduction processes in the time dimension	8:52-56											
	Unique Identification Code	Assigned to items during storage encoding process	6:39-43											
		Must be assigned prior to item being made accessible to a user	6:35-39											
		May be assigned just prior to conversion of item for transmission to reception system, at any time after starting conversion process, or after storing item in compressed data library	6:43-47											
	Unique Address Code	Used to access stored items in compressed data library	10:46-47										File Address	6:50 10-47-50
		A file address for uniquely identifying compressed data items stored in compressed data library section of a library system	10:47-50											
		When combined with frame number and library system address, allows for complete addressabilty of all items stored in one or more compressed data libraries	10:50-54											
		Used along with receiving system address to form a completely unique address for distribution system control	10:54-57											
		An address assigned to an item by the system operator during storage encoding	10:58-61											
		May be assigned prior to long term storage in the compressed data library	6:43-47, 10:58-61											
		May be assigned during storage encoding, along with Unique ID code & popularity code + inputting of program notes	6:48-52											
		Used for requesting and accessing information and items stored in one or more compressed data libraries	10:61-64											
		Makes access to requested data possible	10:64-65											
		Mapped to item names by identification encoder as an alternative method of accessing items	10:5-7											

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ID	Name	Functional Description	Descr. Ref	Input	From	Input Ref.	Output	To	Output Ref.	Mandatory/ Inherently Required/Optional	M/IR/O Ref	Part of	Alias	Alias Ref
	User	May be directly or indirectly (e.g., through cable TV systems) connected (i.e., able to communicate with) to Transmission Systems	4:22-29, 4:35-36											
		In directly connected systems, selects reception system to which requested material is sent and, optionally, the desired playback time	5:10-14											
		In directly connected systems, may remotely access transmission system from location different from that of reception system to which requested material is to be sent a/o played back	5:14-18											
		In indirectly connected systems, can view a/o record copy of decompressed requested material in real time at a chosen time	5:28-31											
		In indirectly connected systems, can record copy of compressed requested material in non-real-time at a chosen time	5:28-31											
		May play back copy protected items once, may review select portions of items prior to their erasure from memory, a/o may make copies when not precluded or specifically enabled	5:39-45											
		Able to move through data in various modes, thus moving through frame addresses at various rates	8:34-36											
		May enter song number & have just that song transferred from transmission system or played back from local storage on receiving system	8:37-42											
		May access an item via its unique identification code or its title	11:22-25											
		May use known facts other than identification code & title to access an item	11:22-25											
		May access items in compressed data library directly using the unique address code	11:25-28											
		May access items via remote order processing and item database	11:25-28											
		May interact with remote order processing and item database through synthesized voice system, query type of computer interface, or customer assistance operators	11:28-32											
		Plurality of users can be supported	11:50-53											
		Can access data stored in item database master via application programs running on system control computer & reception system of user	11:57-60											
		May connect to item database via any available communications channels	11:60-62											
		May use key word searches through remote order processing & item database to locate & request items or partial items for transmission	12:8-21											
		May issue requests to transmission system either directly to the library access interface or indirectly through remote order processing & item database then to library access interface	13:37-40											
		Customer access via library access interface may use variety of methods, including telephone tone decoders & voice response hardware, operator assisted services, and user terminal interfaces	13:48-51, 13:57-60											
		When telephone tone decoders & voice response hardware is used, customer access may be directly to a computer order entry system w/help provided by a computer synthesized voice	13:61-66											
		Normally accesses a dynamic catalog to assist w/selections	13:66-67											
		May receive confirmation of selections & pricing information prior to completion of transactions	13:68-14:3											
		If accessing through remote order processing & item database subsystem using telephone tone decoders & voice response hardware, can follow procedure shown in flowchart of Figure 3 [& described above in section on Access Process — Telephone Tone Decoders & Voice Response Hardware]	14:3-6											
		If accessing through remote order processing & item database subsystem using operator assistance, can follow procedure described above in section on Access Process — Operator Assisted Service	14:49-63											

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ID	Name	Functional Description	Descr. Ref	Input	From	Input Ref.	Output	To	Output Ref.	Mandatory/ Inherently Required/Optional	M/IR/O Ref	Part of	Alias	Alias Ref
		If accessing through remote order processing & item database subsystem using terminal interface, can follow procedure shown in flowchart of Figure 4 [& described above in section on Access Process — Terminal Interface Method]	14:64-15:2											

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